

Fig. 3.—Incisors and canine of *Dendrolagus Dorianus* ♂. Natural size in profile.

Fig. 4.—The central incisors of the same from the front. Natural size.

Fig. 5.—Upper part of the body of *Osphranter rufus*, Demarest, ♂ in profile showing the same peculiarity in the direction of the hair on the neck. Converging point of the dividing lines "between the portions of fur" with the hair differently directed. The darts show the direction of the hair on different parts of the body.

Figs. 1, 2, 5 are sketches made with the help of a camera lucida, from stuffed specimens of the Macleay-Museum.

ON TRIBRACHYOCRINUS CORRUGATUS (F. RATTE.)
Spec. Nov. FROM THE CARBONIFEROUS SAND-
STONE OF NEW SOUTH WALES.

Plate LXVIII.

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Professor M'Coy first described in 1847 (*Tribrachyocrinus Clarkei*), for which he created a new genus (1.)

Professor de Koninck later described specimens of this fossil also. (2.)

(1.) Ann. and Mag. of Nat. Hist. Vol. XX., p. 228. Pl. XII., fig. 2.

(2.) Fossiles Paléozoïques de la Nouvelle Galles du Sud," 1877, part the third, p. 161, pl. 6, fig. 5.

The new species which I intend to describe agrees very closely with both Prof. de Koninck and Prof. McCoy's descriptions, but especially with the latter. The specimen is in the Australian Museum.

The chief difference it presents to *Tribrachyocrinus Clarkei*, is in the external appearance, the new species being wrinkled or ridged on the surface, whilst the first one is smooth.

The fossils that Dana has described under the generic name of *Pentadia* (several species) (1), are probably separate plates of *Cyathocrinus*, but they might as well be separate plates of *Tribrachyocrinus*.

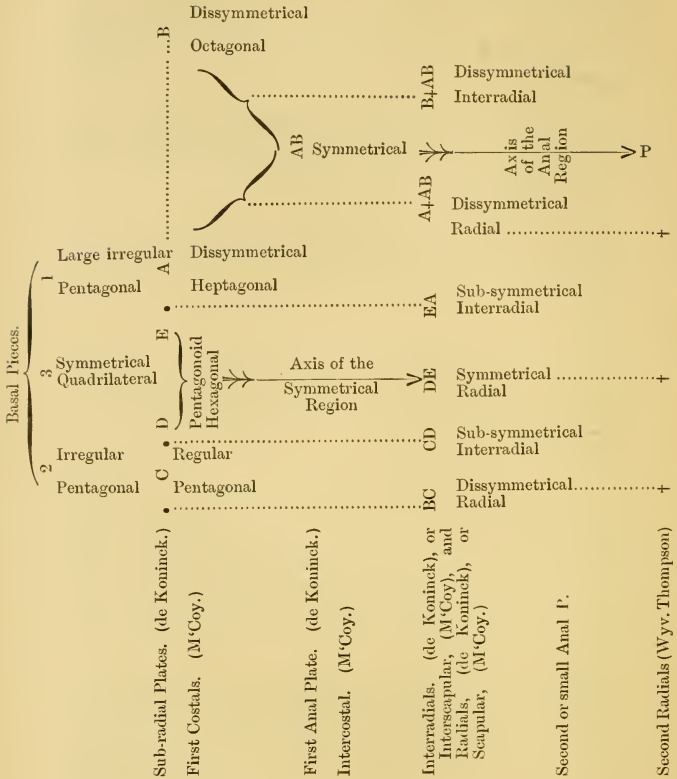
The inner casts of these two genera are often found in the same beds, but in *Cyathocrinus* the basal plate is formed of five articles, whilst in *Tribrachyocrinus* it is formed of three articles only as in *Platycrinus*.

CALYX.

In order to afford, besides the diagrams figured, a ready systematic schema of the relative disposition of the plates forming the calyx, I will name these pieces as follows (fig. 1, pl. 68):— 1, 2, 3 for the three basal pieces, A B C D E for the five adjacent subradial plates.

The anal, inter-radial, and radial plates will be named by composing the letters of the two adjoining plates. For instance, the anal plate being adjacent to A and B, will be called AB, and so on. It will then be easy to read the following tabular disposition:—

(1.) Am. Jour. Science. Vol. IV., 1847, and Geol. U. S. Expl. Exped., p. 713., pl. 4, f. 10.



The region 3, D.E. (D E) radiating from 3 can be called the *Symmetrical region*, its plane axis cutting in halves 3 and (D E), whilst the region nearly opposite including the first and second

anal, and the adjoining radial and interradial (A + AB), and (B + A B), can be called the *Anal region*, its plane axis cutting in halves (A B) and p.

The detail of this arrangement is the following :—

The tripartite division of the *basal* plates and the situation of the so-called *anal* plates cause the row of five plates which follow the basal and are called *sub-radial* (*sous-radiales*) by Prof. de Koninck, and *first costals* by Prof. McCoy, to be, necessarily, formed of irregular elements.

Prof. de Koninck, at page 161 has given a geometrical diagram of the plates, of *Tribrachyocrinus Clarkei*. The basal pentagon in this diagram is made regular, and the three sides on which fall the divisions are made straight. The diagram given by Prof. M'Coy of the same species is nearer the diagram I give of the new species (pl. 68.)

The fossil being observed from above, the medial line of division of the basal plate projected downwards and the two lateral lines of division projected upwards, it will be seen that the basal pentagon is not regular, and may even be more exactly considered as an irregular octagon with three re-entering angles at the points of junction of the three segments, the general outline of the figure, however, approaching a regular pentagon. Moreover of the two segments adjacent to the medial division *a i*, one much more extended than the other, is the segment adjacent to the anal region, and, as a consequence, the angle *a i d* is greater than the angle *a i f*.

To follow this first irregularity, the three subradial plates which are not adjacent to the anal region, are not of the same shape, one C, adjacent to *b c*, is pentagonal, whilst the two D and E, adjacent to *cde*, and *efg*, are, we may say, hexagonal with two of their sides only about half the length of the others.

As to the two other subradial plates A and B, those adjoining the anal region, they differ only a little from each other. One of them, B, adjacent to *hab* being irregularly octagonal, whilst the other one, A, adjacent to *gh*, is irregularly heptagonal, both with one re-entering angle.

The intercostal or anal plate, which, as seen in our specimen, presents a re-entering angle at its upper part, exhibits a bilateral symmetry, being octagonal in shape, and is made to fit in the two re-entering angles of the two preceding subradial plates. Lastly, I will remark that the last row being composed as follows, three radials, three interradials, and the second costal or second anal p, forms a continuous set of plates fitting each other by alternating re-entering angles. For instance, the second costal occupying the space between an irregular radial and an interradial, fits on one side, in the re-entering angle of the radial, and on the other, is provided with a cuneiform projection fitting the next interradial plate.

ORNAMENTS OF THE CALYX.

The external ornaments of the Calyx are fairly impressed in the external cast with which it was possible to obtain a *positive* representation in plaster of Paris, of the outer part of the Calyx. These ornaments are composed of coarse granulations which give the fossil an apparent resemblance to *Platycrinus granulatus* (Austin) of the Carboniferous of Belgium. The difference, however, is very great, between the ornaments of *Platycrinus granulatus* and those of *Tribrachyocrinus corrugatus*. In the first they consist of irregular tubercles, sometimes following each other in sequence or meeting together for a short distance, but without regularity. Sometimes these tubercles are rounded, sometimes they are angular

In *Trib. corrugatus* the ornaments form a network of ridges, leaving hollows between them, except on the radials where separated tubercles disposed into radiating lines are to be seen as in fig. 7, pl. 68.

Both the external cast and the internal cast are represented. Pl. 68, figs. 2 to 5.

These internal and external casts show, above the three radials, the impressions of the second radials which were not known before. These I was more inclined to call *first brachial articles*; they come into contact with the *radials* by a sharp straight edge, their under surface, as well as the surface of the corresponding part of the radial, exhibiting fine striæ produced by the attachment of muscles which allowed the arms to move in a plane

perpendicular to the straight articulation and passing at or near the centre of the Calyx. It was, therefore, acting like a hinge.

The shape of this articulation with the striated surfaces of attachment of the muscles is represented Plate 68, figs. 2 to 12, on a doubled scale.

It is nearly that of an isosceles triangle, the larger base of which is the straight edge. The opposite obtuse angle is provided with an inner groove, which is the continuation of the arm-channels or ambulacral groove, communicating with the digestive apparatus.

The upper side is convex, except round the groove, where it is hollowed in the shape of a saucer to receive the next arm-plate. Moreover, this saucer-shaped hollow is provided with a semi-circular *pad* ("bourrelet") or ridge, nearly concentric with the outer margin of the hollow, as seen in the genera *Platycrinus* and *Poteroocrinus*, on the fixed plates that Prof. de Koninck calls "pièces supérieures" (1.)

ARMS.

Traces of the arms are impressed above the last-mentioned articulation, but not in a sufficient state of neatness for description. I have seen in the collection of the Geological Department a beautiful impression, representing two branches of arms four inches in length and $\frac{3}{20}$ ths of an inch in thickness. Each article is cuneiform in shape, say presenting a maximum of thickness at the extremity of one diameter, and a minimum at the other extremity of the same diameter alternately, the thickest part (distal end) giving insertion to a spine. Some *syzygies* also are distinguished. But it is not known if these arm-branches are those of *Tribrachyocrinus* or of *Cyathocrinus Konincki*, which both occur in the same beds.

"VOÛTE" (VAULT), OR OUTER PART OF THE CALYX.

Between the arm-plates are seen the casts of very small plates, irregular in shape, which doubtless belong to the so-called "voûte" (vault), or outer part covering the calyx, as in *Rhodocrinus*, for instance. Many of these small plates are four-sided, few are five-sided.

(1.) Desc. des Anim. Foss. Carb. Belg., 1842-4. Plate F.

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EXPLANATION OF PLATE LXVIII.

- Fig. 1.—Diagram of the plates of *Tribrachyocrinus corrugatus*, including the second radials articulated with the first radials.
- Fig. 2.—Upper side view of the outer part of the Calyx, from a plaster cast obtained from the sandstone hollow cast (negative). The three second radials and a part of the small plates of the vault are seen.
- Fig. 3.—Upper side view of the inner cast (sandstone) of the Calyx showing the negative casts of the three second radials and of a part of the small plates of the vault. Taken in the same position as fig. 2.
- Fig. 4.—Under side view of the outer part of the Calyx, from a plaster cast as in fig. 2. Showing the three basal plates and the sub-radial B on the right of the fig.
- Fig. 5.—Under side view of the inner cast of the Calyx, taken in the same position as fig. 4.
- Fig. 6.—View of the symmetrical radial, showing the granulations of the surface. Double size.
- Fig. 7.—Under side of the second radial showing muscular striæ. Double size.
- Fig. 8.—Upper side of the same showing socket for the first article of the arm. Double size.
- Fig. 9.—Side view of the same. Double size.
- Fig. 10.—Medial section of figs. 6 and 7, arranged so as to show the place of the muscle and their relative position. Double size.
- Fig. 11.—Section *pq.* of second radial. Double size.
- Fig. 12.—Section *rs.* of same.

 ON THE LARVÆ AND LARVA-CASES OF SOME
 AUSTRALIAN APHROPHORIDÆ.

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(Plates LXIX. and LXX.)

There are several instances of insect larvæ building a kind of shell, if not shell in structure, at least in form. In *Helicopsyche*, a phryganid (Trichoptera), the larva of which lives in the waters of warm countries, the shell is in the shape of an *Helix*, and is formed of agglutinated sand. This shell often includes bright minerals, such as quartz, garnets, amphibole, mica (New Caledonia.) In a classical instance, it is formed of small *Planorbis* (Westwood). In this country the female of a case-moth lives in a perfectly helicoidal shell apparently formed by agglutinated vegetable matter.